Escalate: Economics and Business Journal
https://journal.takaza.id/index.php/escalate

Vol. 4, No. 4, 2026, pp. 813-825
E-ISSN: 3025-4213

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Strategy to Strengthen the Competitiveness of PT Bio Farma's (Persero) Vaccine Business Using Porter's Generic Strategies Approach

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Article History:
Received : 08-09-2026
Revised : 21-10-2026
Accepted : 22-10-2026

Keywords: Business Competitiveness, Competitive Strategy, Differentiation Strategy, Generic Strategies, Vaccine Industry

Abstract : *This research is motivated by the increasingly fierce competition in the vaccine industry and the need for PT Bio Farma (Persero) to maintain and strengthen the competitiveness of its vaccine business. The study aims to analyze the internal and external environments and formulate strategies to strengthen the competitiveness of PT Bio Farma (Persero)'s vaccine business. The study used a qualitative method with a descriptive approach. The research instruments included researchers, interview and observation guides, and documentation. While data analysis was carried out through data collection, reduction, presentation, and verification, followed by IFE, EFE, IE, SWOT, and Porter's Generic Strategies analysis. The results showed that the IE matrix placed the company in quadrant V or hold and maintain with market penetration and product development strategies, while the SWOT matrix generated 12 alternative strategies. The conclusion of the study showed that the differentiation strategy had the highest level of suitability and was the main strategy because it was supported by quality, international standards, R&D, innovation, technology, reputation, service, and distribution.*

How to Cite: Desti Mutiah, Caesar Octoviandy Purba, Hafid Aditya Pradesa, Nanda Ravenska. (2026). *Strategy to Strengthen the Competitiveness of PT Bio Farma's (Persero) Vaccine Business Using Porter's Generic Strategies Approach*. vol(no). pp. https://doi.org/10.61536/escalate.vxxxx.xxx

https://doi.org/10.61536/escalate.vxxxx.xxx

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Introduction

The pharmaceutical industry plays a strategic role in maintaining national health resilience and ensuring the availability of essential health products. However, pharmaceutical companies face increasing competitive pressure due to technological developments, regulatory requirements, and changing public health needs. In Indonesia, compliance with Good Manufacturing Practices (CPOB) is a fundamental requirement for pharmaceutical production under BPOM Regulation No. 7 of 2024. The COVID-19 pandemic further highlighted the importance of strengthening domestic pharmaceutical capabilities to ensure the continuity of medicine and vaccine supplies (Maulana & Abadi, 2025). Consequently, pharmaceutical companies need appropriate business strategies to respond to regulatory demands and maintain their competitiveness.

Competition is particularly relevant in Indonesia's vaccine industry. According to Risalah (2023), Indonesia had 217 pharmaceutical companies in 2023, reflecting the competitive environment in which pharmaceutical businesses operate. The manuscript also reports that PT Bio Farma (Persero) held a 9% share of the global vaccine market and a 79.7% share of Indonesia's vaccine and antisera market, based on the WHO Global Vaccine Report (2025) and IQVIA Research & Analysis data (2025), respectively. Despite its strong domestic market position, Bio Farma faces challenges in maintaining its competitiveness. The company has experienced fluctuations in vaccine production, while some production facilities require modernization and additional capacity to support the development of new products. The company also faces limitations in applying modern technologies, including mRNA technology acquired through technology-transfer collaboration, and requires substantial investment in research, development, testing, and production facilities. These challenges indicate that a strong market position does not necessarily ensure a sustainable competitive advantage.

External pressures further complicate Bio Farma's competitive position. The company's 2024 annual report indicates that its revenue remains largely associated with government demand and national health programs, while the private market has not been fully utilized (Bio Farma, 2024). Competition has also increased with the presence of local and international vaccine manufacturers, including JBio, Biotis, Etana, Combiphar DongA, GSK, Kalbio, and Daewoong. These conditions create a strategic need to evaluate the company's internal strengths and weaknesses alongside external opportunities and threats. Such an evaluation can provide a basis for identifying strategies that correspond to the company's current resources, operational constraints, and competitive environment.

Previous research has applied SWOT analysis and the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices to identify strategic factors and formulate alternatives for improving business competitiveness (Pratama et al., 2026). Lestari et al. (2023) also highlighted the relevance of competitive strategy in responding to market competition. However, identifying internal and external factors and generating strategic alternatives are different from determining which generic competitive strategy best fits a company's business conditions. Porter (1980) identifies three generic strategies: cost leadership, differentiation, and focus. Integrating these strategies with IFE, EFE, the Internal-External (IE) matrix, and SWOT analysis provides a framework for moving beyond the identification of strategic factors toward evaluating the suitability of alternative competitive approaches. The contribution of this study is therefore the integration of these analytical tools into a single framework for examining the competitiveness of a state-owned pharmaceutical company operating in the vaccine industry.

This study is relevant because Bio Farma must maintain its established market position while addressing production constraints, technological development needs, investment requirements, and intensifying competition. By combining internal and external environmental analysis with Porter's Generic Strategies, the study seeks to identify a competitive strategy that is consistent with the company's strategic position and business conditions. Accordingly, this study aims to (1) analyze the internal and external environmental conditions of PT Bio Farma (Persero)'s vaccine business, (2) identify and evaluate strategic factors using the IFE, EFE, IE, and SWOT analyses, and (3) determine the most suitable strategy among Porter's generic strategies to strengthen the competitiveness of the company's vaccine business.

Research Methods

This study employed a qualitative method with a descriptive approach to obtain an in-depth understanding of the internal and external environmental conditions and to formulate strategies for strengthening the competitiveness of PT Bio Farma (Persero)'s vaccine business. The qualitative approach was used to understand the phenomenon through descriptive and interpretive non-numerical data, while the descriptive approach was applied to examine, describe, and interpret information obtained from the field and other relevant sources (Sugiyono, 2019; Sumbodo et al., 2024; Waruwu, 2024). In addition to qualitative analysis, the study employed a simple quantitative analysis technique involving the assignment of weights, ratings, and weighted scores in the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices to support the identification and evaluation of the company's strategic conditions.

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The research instruments consisted of the researcher as the primary instrument, interview and observation guidelines, and supporting equipment, including writing materials, notebooks, mobile phones, and laptops (Sugiyono, 2019). Data analysis was conducted continuously through the stages of data collection, data reduction, data presentation, and verification or conclusion drawing, following the data analysis concept of Miles and Huberman as described by Sugiyono (2019). The collected data were subsequently analyzed to identify the company's internal and external environmental factors. The identified factors were then evaluated using the IFE, EFE, Internal-External (IE), SWOT, and *Porter's Generic Strategies* matrices to formulate appropriate strategies for strengthening the competitiveness of PT Bio Farma (Persero)'s vaccine business.

This study did not employ a population and sample in the conventional quantitative research sense but relied on information sources selected based on the relevance of their knowledge, experience, and involvement with the research subject. The sources of information were selected purposively by considering their ability to provide data and information relevant to the research focus. The information obtained was intended to provide an in-depth understanding of business strategy formulation, product development, marketing, commercialization, distribution, competitive conditions, and efforts to strengthen the competitiveness of PT Bio Farma (Persero)'s vaccine business.

The research procedure was carried out through a series of interconnected stages, beginning with the selection of the research topic and title, proposal preparation, research design seminar, instrument development, data collection and processing, preparation of the final research report, registration, and final examination. The study was conducted at PT Bio Farma (Persero), Jalan Pasteur No. 28, Pasteur Village, Sukajadi District, Bandung City, West Java, over a six-month period from February to August 2026. Primary data were obtained through in-depth interviews and observations, while secondary data were collected from annual reports, company documents, official websites, previous studies, scientific journals, and other relevant literature. Data validity was strengthened through technical triangulation by comparing information obtained from interviews, observations, and documentary studies. This process was undertaken to ensure the consistency of the information and enhance the credibility of the data used in formulating strategies to strengthen the competitiveness of PT Bio Farma (Persero)'s vaccine business.

Results and Discussion

Internal Environmental Analysis

1. Marketing

PT Bio Farma (Persero)'s marketing capabilities demonstrate its core strengths in its extensive distribution reach, ability to meet national vaccine needs, and implementation of a cold chain system. The company reaches 38 provinces in Indonesia and more than 150 countries, is capable of supplying 13 of the 14 antigens to support the national immunization program, and has experience distributing vaccines to remote areas. However, vaccine distribution also presents challenges because deliveries must be made within a maximum of 48 hours and require different temperature controls depending on the vaccine type. These conditions indicate that distribution capability is a crucial strength in supporting the company's competitiveness, although the complexity of its management is a weakness. This finding aligns with Wheelen et al. (2018) regarding the importance of distribution in creating and delivering value to customers and Nevinra et al. (2025) who emphasized the crucial role of distribution networks in maintaining a company's competitiveness.

2. Finance

PT Bio Farma (Persero)'s financial aspects demonstrate weaknesses in the form of dependence on imported raw materials, which impact production costs, cost of goods sold (COGS), and vaccine selling prices. The use of raw materials in foreign currencies makes production costs vulnerable to exchange rate fluctuations and import price increases, thus impacting product price competitiveness. This condition aligns with Wheelen et al. (2018) who stated that financial resource management plays a role in supporting the sustainability and achievement of company goals, and Munzirwan (2024) who

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emphasized that effective and efficient financial management is essential for improving business competitiveness and sustainability.

3. Research and Development

PT Bio Farma (Persero)'s Research and Development (R&D) sector demonstrates strengths in vaccine development, human resource competency, and the ability to acquire technology through technology transfer collaborations, including mRNA technology through CEPI. However, the company still faces weaknesses such as the lengthy vaccine development process, which requires preclinical and clinical stages, limited mastery of modern vaccine technology compared to competitors, and the need for consistent management policies to enable innovations to be developed into products. These conditions indicate that strengthening technology and accelerating R&D are crucial factors in producing new vaccine products and maintaining the company's competitiveness. These findings align with Wheelen et al. (2018) who position R&D as a crucial component of innovation and product development, and Wati (2025) who demonstrated that strengthening R&D contributes positively to increasing company competitiveness.

4. Production and Operations

PT Bio Farma (Persero)'s production and operations demonstrate strength through its annual production capacity of approximately 3.5 billion doses, its position as the largest human vaccine producer in Southeast Asia, and its implementation of BPOM standards, WHO Prequalification, and the ISO 9001:2015 quality management system. These strengths are supported by strict quality control to ensure the quality, safety, and effectiveness of vaccine products. However, the company still faces weaknesses in the form of limited land and production facilities that require rejuvenation and technological updates to adapt to evolving industry standards. Therefore, strengthening production facilities and capacity is crucial in maintaining the company's competitiveness, in line with Wheelen et al. (2018) regarding the importance of effective and efficient production and operations management and Septika (2025) which shows that production and operations integration plays a role in increasing company competitiveness.

5. Human Resource Management

PT Bio Farma (Persero)'s human resources (HR) demonstrate strength through competency, experience, and workforce capacity development, supporting its vaccine business activities. The company's HR is considered to have extensive experience in the vaccine industry and has acquired competency development through training in Korea, Japan, the United States, and Italy. This demonstrates that the quality and experience of HR are crucial assets for conducting business and facing competition in the vaccine industry. This finding aligns with Wheelen et al. (2018), who place employee competency and productivity management as crucial to achieving company goals, and Wati (2025), who demonstrated that HR quality can support a company's ability to face competition.

6. Information Technology

PT Bio Farma (Persero)'s information technology capabilities demonstrate its strength through the implementation of an ISO/IEC 27001:2022-compliant information security system and a track and trace system to monitor vaccine distribution. This implementation supports information security, product traceability, and oversight of business processes and vaccine distribution. These findings align with Wheelen et al. (2018), who explain that information technology plays a role in supporting a company's information management and business processes, and Prihandono and Amir (2024), who demonstrate that information technology can improve organizational efficiency through process automation, ease of information access, and increased speed and accuracy of decision-making.

External Environment Analysis

1. Politics

Political aspects are a crucial external factor for the vaccine business, as government policies, immunization programs, and health priorities influence vaccine demand. PT Bio Farma (Persero) benefits from government policies aimed at strengthening national vaccine independence, developing halal vaccines, combating tuberculosis, and expanding HPV immunization, supported by HPV vaccine production capabilities through technology transfer. These conditions demonstrate that government policy direction can expand market opportunities and strengthen the company's role in meeting national vaccine demand. This finding aligns with Wheelen et al. (2018) regarding the influence of policies and

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regulations on the business environment, and Zebua et al. (2023) who demonstrated the importance of government policies in supporting vaccination programs.

2. Economy

The economic aspect poses a threat to PT Bio Farma (Persero), primarily due to its dependence on imported raw materials, which impacts vaccine production costs due to fluctuations in the rupiah exchange rate against the US dollar. A weakening rupiah can increase raw material procurement costs and put pressure on production costs and the company's business continuity. This finding aligns with Wheelen et al. (2018), who explain that economic factors such as exchange rates can impact a company's operational costs, and Sari et al. (2026), who note that exchange rate fluctuations can impact raw material costs and a company's operational activities.

3. Social

The social aspect presents both opportunities and threats for PT Bio Farma (Persero) because public acceptance of vaccines is influenced by values, culture, and health awareness. Opportunities stem from the large potential market for halal vaccines and the increasing need for child health protection through the expanded use of hexavalent vaccines in the national immunization program, while low awareness and acceptance of immunization among some communities pose a threat that could hinder increased vaccination coverage. This condition is in line with Wheelen et al. (2018) that social factors influence public needs and behavior towards products, as well as Zuhdi et al. (2025) regarding the influence of public acceptance on immunization implementation.

4. Technology

The technological aspect presents both opportunities and threats for PT Bio Farma (Persero). Opportunities are obtained through the utilization of Active Cooling System distribution technology and collaboration with the Gates Foundation in the development of the nOPV2 vaccine, which provides access to new knowledge and technology. However, technological developments from local and multinational competitors pose a threat because the company needs to keep up with innovations and vaccine product developments to remain competitive. This finding aligns with Wheelen et al. (2018) regarding the role of technology in improving competitiveness and Wati (2025) who showed that technology adoption and innovation investment contribute to increasing company competitiveness.

5. Legal

Legal aspects pose a threat to PT Bio Farma (Persero) because the vaccine industry has stringent requirements regarding safety, efficacy, quality, production, and distribution. Increasing standards and regulatory changes may require companies to adjust their facilities, equipment, and quality control systems, potentially increasing investment requirements and operational costs. This situation demonstrates that regulatory compliance is a crucial requirement for companies to maintain the quality and compliance of vaccine products with applicable standards.

SWOT Analysis

1. Strengths

A. Wide distribution reach covers 38 provinces in Indonesia and more than 150 countries in the world
B. Large production capacity of around 3.5 billion doses per year
C. Have competent and experienced human resources
D. The quality and safety of vaccine products are guaranteed through BPOM and WHO Prequalification standards.
E. Bio Farma's position as one of the largest human vaccine producers in Southeast Asia
F. Strong R&D capabilities in vaccine product development
G. Ability to meet high national vaccine needs to support the immunization program
H. Information security system standardized through ISO/IEC 27001:2022
I. Implementing a track and trace system to improve monitoring of vaccine distribution

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2. Weaknesses

A. Vaccine delivery must be carried out within a 48-hour time limit and needs to be adjusted to the different cold chain system requirements for each type of vaccine.
B. The condition of biologics manufacturing facilities does not meet BPOM and WHO standards.
C. Land limitations hamper the development and expansion of vaccine production facilities.
D. The research and development process for new vaccines at Bio Farma is quite long and can take up to 15-20 years.

3. Opportunities

A. The huge potential market for halal vaccines in Muslim-majority countries
B. Great support from the government in the development of halal vaccines
C. Significant support for the development of vaccine distribution technology through the collaboration between PT Pos Indonesia and Bio Farma in the launch of the magic box or active cooling system.
D. The Gates Foundation's substantial support for the development of the nOPV2 vaccine through collaboration with Bio Farma
E. The government's strong commitment to eliminating TB and developing a domestic TB vaccine
F. Potential increase in demand for Hexavalent vaccine along with the expansion of the national immunization program
G. Government policy on cervical cancer elimination is driving demand for the HPV vaccine.

4. Threats

A. Increasingly fierce competition from local and multinational private competitors
B. The strong capability of PT Biotis Pharmaceuticals in producing human vaccines such as pentavalent and PCV has increased competition with Bio Farma.
C. Low awareness and level of public acceptance of the importance of immunization
D. Uncertainty in raw material purchase prices due to exchange rate fluctuations
E. Increasingly stringent standards and requirements for vaccine quality to meet WHO standards

IFE Matrix

The weights and ratings in the IFE Matrix were determined based on information provided by the Head of the Business Strategy Division, which was then calculated by the author. These figures were processed using Excel. The following are the results of the IFE Matrix:

Table 1. IFE Matrix

Internal Factors	Weight	Rating	*Weighted Score*
Strengths (S)	(0.0 – 1.0)	(3 or 4)	
1. Wide distribution reach covers 38 provinces in Indonesia and more than 150 countries in the world	0.120	4	0.48
2. Large production capacity of around 3.5 billion doses per year	0.035	3	0.11
3. Have competent and experienced human resources	0.038	3	0.11
4. The quality and safety of vaccine products are guaranteed through BPOM and WHO Prequalification standards.	0.080	4	0.32
5. Bio Farma's position as one of the largest human vaccine producers in Southeast Asia	0.072	4	0.29
6. Strong R&D capabilities in vaccine product development	0.045	3	0.14
7. Ability to meet high national vaccine needs to support the immunization program	0.045	3	0.14
8. Information security system standardized through ISO/IEC 27001:2022	0.020	3	0.06
9. Implementing a track and trace system to improve monitoring of vaccine distribution	0.038	3	0.11
Total Strengths (S)	**0.500**		**1.77**
Weaknesses (W)	(0.0 – 1.0)	(1 or 2)	
1. Vaccine delivery must be carried out within a 48-hour time limit and needs to be adjusted to the different cold chain system requirements for each type of vaccine.	0.045	2	0.09
2. The condition of biologics manufacturing facilities does not meet BPOM and WHO standards.	0.155	1	0.16

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3.	Land limitations hamper the development and expansion of vaccine production facilities.	0.087	2	0.17
4.	The research and development process for new vaccines at Bio Farma is quite long and can take up to 15-20 years.	0.150	1	0.15
5.	Limited mastery of modern vaccine technology	0.063	2	0.13
Total Weaknesses (W)		**0.500**		**0.70**
Total Strengths(S) and Weaknesses (W)		**1.00**		**2.47**

Source: Data processed by researchers (2026).

Based on the results of the IFE matrix calculation, PT Bio Farma (Persero) obtained a total weighted score of 2.35.(David & David, 2017), a total weighted score of 2.50 is the average value indicating the company's internal conditions. A score above 2.50 indicates that the company's internal conditions are quite strong, while a score below 2.50 indicates that the company's internal conditions are weak. Thus, an IFE matrix score of 2.47 indicates that PT Bio Farma (Persero) has weak internal conditions, so the company still needs to strengthen its internal factors. The strength factor with the highest weighted score is its wide distribution reach covering 38 provinces in Indonesia and more than 150 countries worldwide, with a weighted score of 0.48. Meanwhile, the weakness factor with the smallest weighted score is limited distribution flexibility due to the maximum delivery time limit of 48 hours and the need to implement an appropriate cold chain system for each type of vaccine.

EFE Matrix

The results for the Opportunities and Threats items below are data obtained from articles, documents, and journals from 2024 to 2026 that are relevant to PT Bio Farma (Persero), specifically in the vaccine business. The weights and ratings in the EFE matrix were determined based on information provided by the Head of the Business Strategy Division, followed by the author. These figures were processed using Excel. The following are the results of the EFE matrix:

Table 2. EFE Matrix

External Factors		Weight	Rating	*Weighted Score*
Opportunities (O)		(0.0 – 1.0)	(3 or 4)	
1.	The huge potential market for halal vaccines in Muslim-majority countries	0.030	3	0.09
2.	Great support from the government in the development of halal vaccines	0.038	3	0.011
3.	Significant support for the development of vaccine distribution technology through the collaboration between PT Pos Indonesia and Bio Farma in the launch of the magic box or active cooling system.	0.125	4	0.50
4.	The Gates Foundation's substantial support for the development of the nOPV2 vaccine through collaboration with Bio Farma	0.150	4	0.60
5.	The government's strong commitment to eliminating TB and developing a domestic TB vaccine	0.042	3	0.13
6.	Potential increase in demand for Hexavalent vaccine along with the expansion of the national immunization program	0.050	3	0.15
7.	Government policy on cervical cancer elimination is driving demand for the HPV vaccine.	0.065	3	0.20
Total Opportunities (O)		**0.500**		**1.78**
Threats (T)		(0.0 – 1.0)	(1 or 2)	
1.	Increasingly fierce competition from local and multinational private competitors	0.120	1	0.12
2.	The strong capability of PT Biotis Pharmaceuticals in producing human vaccines such as pentavalent and PCV has increased competition with Bio Farma.	0.090	1	0.09
3.	Low awareness and level of public acceptance of the importance of immunization	0.080	2	0.16
4.	Uncertainty in raw material purchase prices due to exchange rate fluctuations	0.130	1	0.13
5.	Increasingly stringent standards and requirements for vaccine quality to meet WHO standards	0.080	1	0.08
Total*Threats (T)*		**0.500**		**0.58**
Total Opportunities (O) and Threats (T)		**1.00**		**2.36**

Source: Data processed by researchers (2026).

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Based on the EFE matrix calculation results, PT Bio Farma (Persero) obtained a total weighted score of 2.39. This indicates that PT Bio Farma (Persero) has a suboptimal condition, because the total weighted score is still below the average value of 2.50. This condition indicates that the company has not been able to optimally utilize available opportunities in facing external threats. The main opportunity with the highest weighted score is the Gates Foundation collaborating with Bio Farma in the development of the nOPV2 vaccine, with a weighted score of 0.60. Meanwhile, the threat with the smallest weighted score is the increasingly stringent vaccine quality regulatory requirements issued by the WHO at 0.08.

IE Matrix

The Internal-External (IE) Matrix is the next step after developing the IFE and EFE matrices. This matrix is obtained by combining the results of the analysis of the company's internal and external factors to determine the company's position in one of nine available cells. This position is then used as the basis for determining alternative strategies in the matching stage. In the IE matrix, the horizontal (X) axis shows the total value of the IFE matrix, while the vertical (Y) axis shows the total value of the EFE matrix.

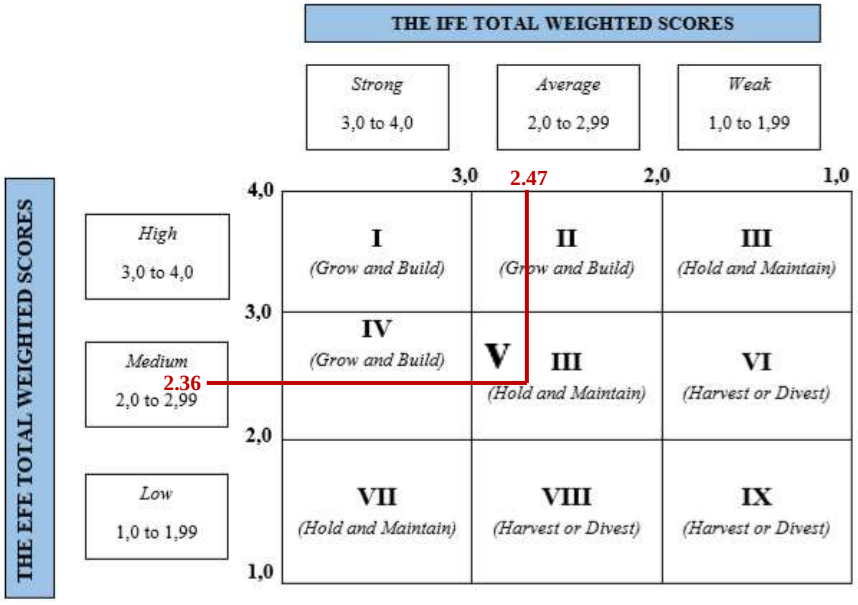


Figure 1. IE Matrix

Source: Data processed by researchers (2026).

Based on the IE matrix, PT Bio Farma (Persero) is in quadrant V with average internal and medium external conditions, thus falling into the hold and maintain position. This position indicates the need to maintain the company's condition while strengthening internal and external factors through market penetration and product development strategies. Market penetration is aimed at expanding reach and increasing consumer reach through strengthening marketing, while product development is carried out through refinement or creation of new products that meet market needs and are supported by research and development activities.

SWOT Matrix

Table 3. SWOT Matrix

IFE / EFE	*Strengths (S)*	*Weaknesses (W)*
	S1. Wide distribution reach covers 38 provinces in Indonesia and more than 150 countries in the world S2. Large production capacity of around 3.5 billion doses per year S3. Have competent and experienced human resources	W1. Limited distribution flexibility W2. vaccines due to the maximum delivery time limit of 48 hours and the need to implement a cold chain system W3. The condition of biologics manufacturing facilities does not meet BPOM and WHO standards.

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	S4. The quality and safety of vaccine products are guaranteed through BPOM and WHO Prequalification standards. S5. Bio Farma's position as the largest human vaccine producer in Southeast Asia S6. Strong R&D capabilities in vaccine product development S7. Ability to meet high national vaccine needs to support the immunization program S8. Information security system standardized through ISO/IEC 27001:2022 S9. Implementing a track and trace system to improve monitoring of vaccine distribution	W4. Land limitations hamper the development and expansion of vaccine production facilities. W5. The research and development process for new vaccines at Bio Farma is quite long and can take up to 15-20 years. W6. Limited mastery of modern vaccine technology
Opportunities (O)	**SO Strategy**	**WO Strategy**
O1. The huge potential market for halal vaccines in Muslim-majority countries O2. Great support from the government in the development of halal vaccines O3. Significant support for the development of vaccine distribution technology through the collaboration between PT Pos Indonesia and Bio Farma in the launch of the magic box or active cooling system. O4. The Gates Foundation's substantial support for the development of the nOPV2 vaccine through collaboration with Bio Farma O5. The government's strong commitment to eliminating TB and developing a domestic TB vaccine O6. The growth potential of the Hexavalent vaccine market in the national immunization program O7. Government policy on cervical cancer elimination is driving demand for the HPV vaccine.	SO1. Expanding the halal vaccine market to Muslim-majority countries by leveraging international distribution reach, large production capacity, and meeting international quality standards (S1, S2, S4, O1, O2) SO2. Strengthening the development and provision of national priority vaccines through the utilization of R&D capabilities and production capacity to support the TB, Hexavalent, and HPV (S2, S6, S8, O5, O6, O7) vaccine programs. SO3. Improving the reliability of vaccine distribution through the use of Active Cooling System technology and a track and trace system to expand reach and maintain vaccine quality (S1, S7, S11, O3)	WO1. Accelerate the mastery of modern vaccine technology by strengthening cooperation on technology transfer and vaccine development with international partners (W4, W5, O4) WO2. Strengthening new vaccine development capacity through R&D collaboration with the government and strategic partners to support the development of TB vaccines and national priority vaccines (W4, W5, O5, O6, O7) WO3. Increasing the efficiency and flexibility of vaccine distribution through the use of Active Cooling Systems to overcome delivery time constraints and the need for cold chain systems (W1, O3)
Threats (T)	**ST Strategy**	**WT Strategy**
T1. Increasingly fierce competition from local and multinational private competitors T2. The strong capability of PT Biotis Pharmaceuticals in producing human vaccines such as pentavalent and PCV has increased competition with Bio Farma. T3. Low awareness and level of public acceptance of the importance of immunization T4. Uncertainty in raw material prices due to exchange rate fluctuations T5. Increasingly stringent standards and requirements for vaccine quality to meet WHO standards	ST1. Strengthening the competitiveness of vaccine products by improving quality and meeting international standards, as well as strengthening human resource competencies to face competition and increasingly stringent quality standard demands (S3, S4, T1, T5) ST2. Maintaining the vaccine market position by optimizing production capacity, distribution reach, and fulfilling national vaccine needs to face increasing competition from local and multinational vaccine producers (S1, S2, S5, S7, T1, T2) ST3. Increasing public trust in vaccines by strengthening information and education regarding the quality, safety, and benefits of vaccines to support increased acceptance of immunization (S4, S9, T3)	WT1. Accelerate the modernization of vaccine facilities and technology development to increase production efficiency and face competition with vaccine manufacturers with increasingly advanced technology (W2, W5, T1, T2). WT2. Improving the efficiency of raw material procurement and reducing the risk of the impact of exchange rate fluctuations by strengthening procurement management and developing alternative sources of raw materials (W2, W5, T4). WT3. Rejuvenate and improve production facilities and quality management systems to ensure compliance with BPOM and WHO standards and maintain the competitiveness of vaccine products (W2, W3, T5).

Source: Data processed by researchers (2026).

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Porter's Generic Strategies

According to Porter (1980), competitive advantage can be achieved through three generic strategies: cost leadership, differentiation, and focus. In this study, Porter's Generic Strategies was used as the final stage in formulating a strategy to strengthen the competitiveness of PT Bio Farma's (Persero) vaccine business after analyzing the internal and external environments, IFE, EFE, IE, and SWOT. Based on the IE matrix, the company is in quadrant V or hold and maintain, with market penetration and product development strategies. Next, 12 alternative strategies from the SWOT matrix were analyzed based on their suitability with Porter's three generic strategies: cost leadership through efficiency and cost control, differentiation through creating differentiated value, and focus through better service to specific market segments, groups, or regions.

Cost Leadership Strategy

According to Porter (1980), a cost leadership strategy focuses on the ability to produce products at low cost and at competitive prices through efficiency and cost control. PT Bio Farma (Persero) has the ability to offer competitive prices through domestic and in-house production, particularly in government markets. However, dependence on imported raw materials and the need for significant investment in facilities and technology mean that cost control is suboptimal. Therefore, a cost leadership strategy is appropriate for pricing purposes, but it has not yet become the company's primary source of competitive advantage.

Differentiation Strategy

According to Porter (1980), a differentiation strategy is implemented through the creation of products or services that have unique characteristics and different values for customers. PT Bio Farma (Persero) demonstrates differentiation through quality and international standards, experience and reputation as a vaccine producer, product innovation and development, access to mRNA technology through CEPI technology transfer, a vaccine portfolio capable of meeting 13 of the 14 antigens of the national immunization program, and an extensive distribution network with the implementation of a cold chain system and track and trace. Based on these findings, the differentiation strategy has the strongest suitability because it can be built through quality, international standards, innovation, technology, reputation, service, and distribution.

Focus Strategy

According to Porter (1980), a focus strategy is implemented by concentrating on a specific customer segment and meeting its specific needs. PT Bio Farma (Persero) serves the government, private, and export markets, with sales still dominated by the government sector due to its large and ongoing need for vaccines, despite relatively small margins. This situation indicates the implementation of a focus strategy in the government segment, particularly in supporting the national immunization program. However, because the company also serves the private and export markets, the focus strategy has not yet become a primary generic strategy and is more appropriately positioned as a supporting strategy to strengthen competitiveness.

Porter's Generic Strategies Suitability Analysis

Based on the results of the analysis of Porter's three generic strategies, there are differences in the level of suitability with the business conditions of PT Bio Farma (Persero) vaccines.

Table 4. Suitability of Porter's Generic Strategies

Generic Strategy	Compliance with Bio Farma Conditions	Key Considerations	Position
Cost Leadership	Currently	There is a need for COGS efficiency and cost control, but dependence on imported raw materials and exchange rate fluctuations limit the company's ability to make low prices a primary source of competitive advantage.	Supporting strategies
Differentiation	Tall	Supported by product quality, international standards, WHO Prequalification, experience, R&D, innovation, technology transfer, product development, distribution, cold chain, and track and trace	Main Strategy

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Focus	Currently	Having a specific market segment, such as government, but the company's market coverage remains broad because it serves the government, private and export market sectors.	Supporting strategies

Source: Data processed by researchers (2026).

Based on the comparison of the three generic strategies, the differentiation strategy has a stronger level of fit with PT Bio Farma (Persero)'s vaccine business conditions. This strategy aligns with the company's strengths that can provide added value. The selection of a differentiation strategy also aligns with the results of the IE matrix, which places the company in a hold and maintain position with market penetration and product development strategies. In this case, product development can be directed at innovation and the development of new vaccines, while market penetration is carried out by strengthening the company's existing strengths. Thus, a differentiation strategy can be considered by PT Bio Farma (Persero) in strengthening the competitiveness of its vaccine business.

Conclusion

Research shows that the competitiveness of PT Bio Farma (Persero)'s vaccine business is supported by internal strengths in the form of a wide distribution reach, large production capacity, human resource competence, international standard product quality, R&D capabilities, and the implementation of distribution technology and information security systems. However, the company still faces weaknesses in the form of dependence on imported raw materials, limited production facilities and land, the lengthy vaccine development process, and limited mastery of modern technology. From the external environment, the company has opportunities through government support, the development of halal vaccines, TB, Hexavalent, HPV vaccines, and technological collaboration with international partners, but faces threats in the form of increasingly fierce competition, exchange rate fluctuations, low acceptance of immunization by some communities, and increasing vaccine quality standards. The IE matrix places the company in quadrant V or hold and maintain, while the SWOT mapping produces 12 alternative strategies. Porter's Generic Strategies analysis shows that the differentiation strategy has the highest suitability and is the main strategy, while cost leadership and focus act as supporting strategies.

The limitations of this study lie in the use of a qualitative approach with five informants and data sources focused on the vaccine business conditions of PT Bio Farma (Persero). Therefore, the results do not reflect the broader perceptions of customers, competitors, or stakeholders. Future research is recommended to involve more informants and external perspectives and combine quantitative approaches to test the priorities and effectiveness of the formulated strategies. Practically, the research results can be considered by PT Bio Farma (Persero) to prioritize differentiation through quality improvement, innovation, product development, technology strengthening, reputation, service, and distribution, while simultaneously strengthening market penetration and product development according to the hold and maintain position.

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